

REDUCTION OF POSTHARVEST LOSSES OF OYSTER MUSHROOM
(PLEUROTUS. SPP) USING MODIFIED ATMOSPHERE PACKAGING
AND DEHYDRATION TECHNIQUES

By

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ABSTRACT

Oyster mushroom (*Pleurotus* spp.) is commonly grown in Sri Lanka. It is popular due to its high nutrient content, unique flavour and medicinal properties. Shelflife of oyster mushroom is about 2 days under ambient conditions. This study was carried out to reduce the postharvest loss of oyster mushrooms by modified atmosphere packaging (MAP) and dehydration techniques. MAP was tested under ambient (27 ± 2 °C and 82 ± 3 % RH) and low temperature conditions (8 °C and 70 % RH).

Suitability of polypropylene, low-density polyethylene and linear low-density polyethylene (LLDPE) as packaging materials and the effectiveness of 0.5 % calcium chloride and 0.5 % citric acid as a washing treatment were tested based on off-colour and off-odour development in mushroom. A suitable package surface area to weight ratio was also established. Effectiveness of magnesium oxide in modifying the in-package gaseous atmosphere and thereby extending the postharvest life was tested by monitoring the in-package concentrations of oxygen and carbon dioxide, acetaldehyde and ethanol concentrations, weight loss and the 'L' value of oyster mushroom during storage. The developed modified atmosphere packaging systems were compared with commercial packages.

Processing conditions were established to produce a ready-to-use dehydrated product from mushroom by cabinet air-drying. Changes in moisture, total carbohydrate, crude fat, crude proteins, total ash, total calcium and total iron contents during dehydration were determined. The acceptability of the product was tested by using a sensory evaluation panel and a five-point Hedonic scale. A suitable packaging material

for storage of the product was selected based on the moisture content, the water activity, the 'L' value and rehydration ratio of the product. The product was also tested for microbiological quality and the cost of production was estimated.

In-package oxygen concentration of the packages containing 3 g or 5 g of magnesium oxide was above 5 % on Day 4 and Day 12 in storage under ambient and low temperature conditions respectively. Under similar conditions, in-package carbon dioxide concentration was below 5 %. Ethanol contents in the control and mushrooms packaged with 1, 3 and 5 g of magnesium oxide were 210, 125, 105 and 102 ppm and the acetaldehyde contents were 43, 19, 11 and 10 ppm respectively, on Day 4 in storage under ambient conditions. Ethanol concentrations of 52.7, 34.7, 37.7 and 35.7 ppm respectively, were observed in the control and in mushrooms packaged with 1, 3 and 5 g of magnesium oxide on Day 12 in storage at 8 °C. Washing of oyster mushrooms with 0.5% calcium chloride and 0.5% citric acid followed by packaging in 0.015 mm LLDPE in a 3:1 surface area to weight ratio with 3 g of magnesium oxide as a carbon dioxide scavenger was successful in extending the shelflife up to 5 days under ambient conditions and 12 days under low temperature conditions.

Immersing the mushrooms torn into 3 cm strips in 0.05 % sodium bicarbonate for one minute was successful as a pre-treatment to improve the physical properties of the dehydrated product. Drying at 45 °C for 5 hr was sufficient to reduce the water activity from 0.84 to 0.56 and to obtain a shelf stable, microbiologically safe product with good physico-chemical properties. Aluminium foil laminated with high-density polyethylene and polyester terephthalate is suitable for storage of the dehydrated product for 9 months

at 27 ± 2 °C and 82 ± 3 % RH without significant changes in the product colour and rehydration ratio.